

The Light That Doesn't Fail



Systems redundancy is a NASA term for the technique of employing one or more backup units in critical spacecraft components, so that if a primary system fails a backup will automatically take over its work. It's a way of assuring the ultrahigh reliability that spacecraft, particularly manned spacecraft, demand.

This space technique has spread to certain Earth-use systems where a failure could be serious and the extra reliability is worth the added cost. But you would hardly expect to find systems redundancy in a home-use flashlight that sells for less than \$20.

Yet that is exactly what Rayovac Corporation, Madison, Wisconsin has incorporated in its Luma 2 flashlight, which company sales literature bills as "The Light Fantastic." Luma 2, a premium flashlight conceived by Rayovac vice chairman Judy D. Pyle, which features an extra-bright Super Krypton primary bulb, has a completely independent backup system that includes a separate lithium power cell, its own bulb and switch. This innovation won top honors among the Wisconsin Governor's New Product Awards in 1988. It is U.S.-patented to inventors David R. Schaller, Sid A. Megahed, James Neyer and Tom Patterson; foreign patents are pending.

Luma 2 is a two-way spinoff. It not only incorporates NASA technology, it also represents an example of the type of innovation-stimulating assistance NASA's Industrial Applications Centers (IACs) provide to industrial clients like Rayovac, a top flashlight and battery designer and manufacturer that supplies standard and customized batteries to retail markets and to manufacturers of tape recorders, radios, headphones, flashlights, hearing aids and other such products.

In addition to its use of the systems redundancy technique, Rayovac also employed in Luma 2 such NASA-developed technologies as the lithium power cell, which offers a 10-year shelf life, and a magnetic switch with corrosion-proof sealed contacts.

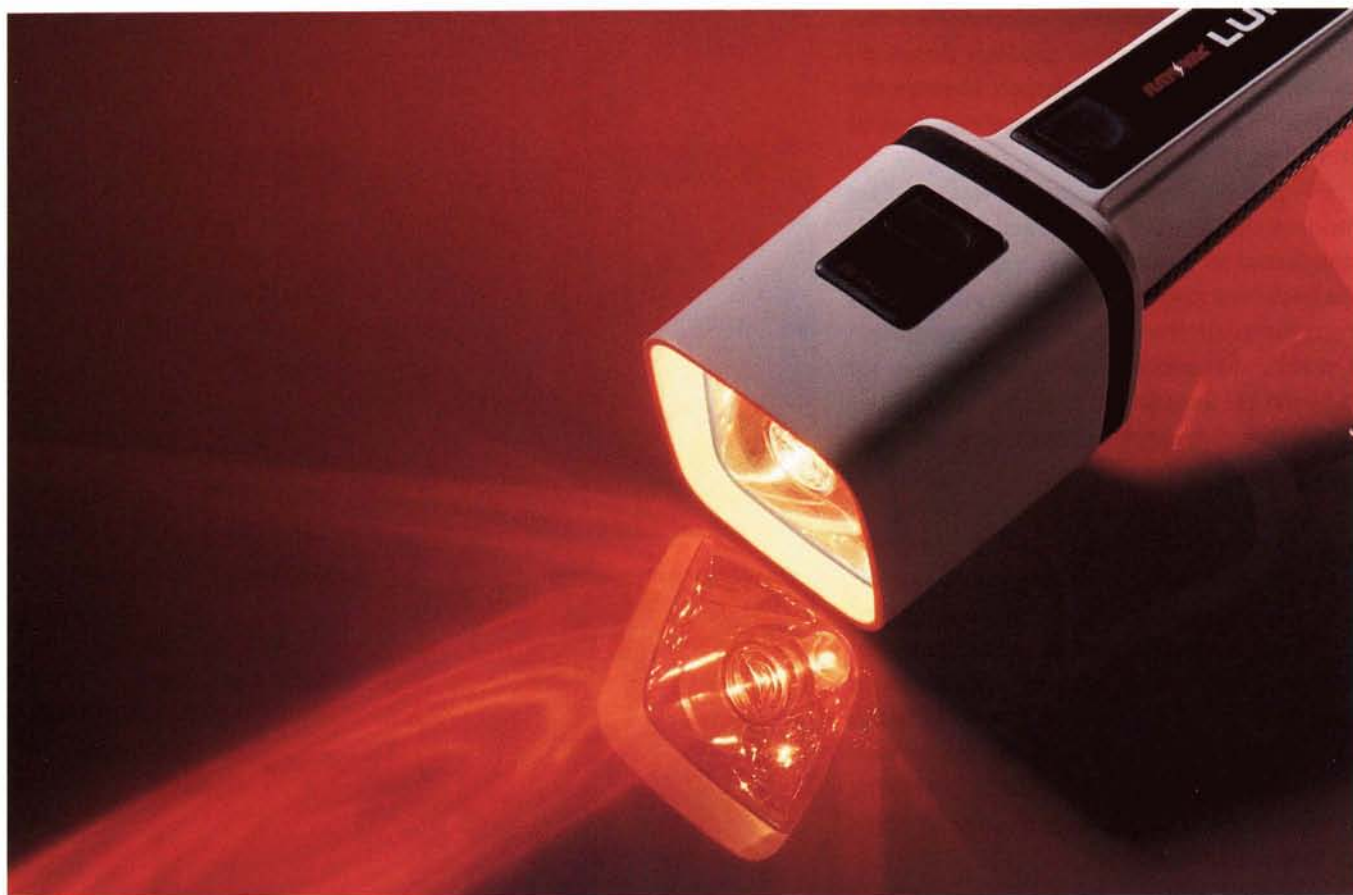
The NASA-sponsored IAC that helped Rayovac on Luma 2 and other projects is NERAC, Inc., Tolland, Connecticut, one of 10 IACs that offer industrial clients access to the NASA data bank and some 400 other computerized databases whose combined storage amounts

***Flashlight battery
innovations typify
aerospace technology
transfers for consumer,
home and recreational
applications***

to nearly 100 million documents. The IACs conduct literature searches to find and apply technical information pertinent to the client's needs.

To stay at the leading edge of its technologies and continually improve upon existing products and processes, Rayovac makes frequent use of NERAC's problem-solving and technical support services. With NERAC's help, Rayovac engineers investigate unfamiliar technical areas, identify qualified outside experts in areas of special interest, stay attuned to the latest developments in their disciplines, and glean valuable insights into competitive activity, patents and industry trends.

Shown below is the Rayovac Luma 2 Flashlight, which features an independent backup lighting system in case the primary fails. At bottom is an exploded view showing both bulbs, both batteries and both switches. In addition to employing the space technique of systems redundancy, Luma 2 incorporates NASA magnetic switch and lithium battery technology.



In addition to identifying technology advances incorporated into Luma 2, NERAC also helped the company develop a zinc air battery for hearing aids and improve one of Rayovac's principal battery lines used in such products as tape recorders and radios.

Says Rayovac senior technical analyst Carrol G. Saxe: "NERAC provides a service to industry that industry could not economically provide for itself. Without NERAC, I estimate that Rayovac would have spent at least \$50,000 gathering the information supplied by NERAC — a tremendous benefit."

